

Falconar (M)

SYNOPSIS

OF

A COURSE of LECTURES

ON

Anatomy and Surgery;

By MAGNUS FALCONAR,

SURGEON

And PROFESSOR of ANATOMY



SEGNIVS IRRITANT ANIMUM DEMISSA PER AURES,
QUAM QUÆ SUNT OCULIS SUBJECTA FIDELIBUS.
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L O N D O N

MDCCLXXVII.

1870

A COURSE OF LECTURES

ON THE HISTORY OF

THE UNITED STATES

OF AMERICA

AND THE WEST INDIES

BY

J. D. D.

NEW YORK

TO THE
Students of **ANATOMY**

IN L O N D O N.

GENTLEMEN,

YOU are engaged in the study of a science, scarcely more interesting to mankind, than profound and difficult to be attained. To explain and facilitate it, has, at different periods, employed the pens of many, and was the object I proposed to myself, in compiling the following sheets. The

A 2

plan,

plan, which, you will observe, Gentlemen, has hitherto been unattempted, is calculated to answer three very important purposes ; First, to free beginners from the necessity of perusing the abstruse treatises written on the subject of anatomy, which, by their tediousness, too often disgust, and more frequently confuse than enlighten the understanding ; Secondly, by a radical and minute explanation, to simplify the terms of art, that occur in the course of each lecture, and by this means, completely to remove an obstacle, which students even of the best classical education, are, it is well known, sometimes, at a stand to surmount. Finally, I have had it particularly in view, to effect a discontinuance of the practice of writing,

ting, in time of lecture; a *practice* not less painful and disagreeable, in the Winter months, than destructive of the very good it is intended to produce. Whilst an anatomical subject is explained, or demonstrated, it is necessary the senses should be perfectly disengaged and free, which, you will readily believe, Gentlemen, can never be the case, when the eye is diverted from the object, and the mind busied in committing to paper a few broken, unconnected sentences, collected hastily, as they flow from the professor's mouth. In such a divided state of the understanding, it is astonishing to observe, how grossly matters are misconceived and facts mistated. What I here affirm, I know by
ex-

experience, and in confirmation of the truth of it, might appeal to every gentleman, who, in the course of his anatomical studies, followed the practice, it is my wish, for the future, to prevent. That I shall see this *wish* accomplished I have every reason to hope, when the student finds collected in this book, and carefully disposed in order, the essential and most interesting parts of each of my lectures; when he finds judiciously pointed out, more than his most unwearied diligence would be capable of effecting; in a word, when he reflects, that, by a few additional remarks made on the interleaves, after lecture, or occasionally during lecture, as the circumstance may permit, he will see himself, at the end,

end of one or two courses, possessed of a complete Treatise on Anatomy, which he may, not improperly, consider as his own. If I should appear to any one rather sanguine in the expectations I form on the present subject; it is the effect of the uncommon encouragement giving to the undertaking by several Gentlemen of the first eminence in the profession, who have all been pleased to think, it bids fairer, than any other plan hitherto adopted, to render the Study of Anatomy more agreeable and easy. This might be deemed a sufficient reason; yet I will beg leave to add another. It is, Gentlemen, *the effect* of the desire I feel, of fulfilling, in the amplest manner, my engagements with you, and of returning

8 TO THE STUDENTS, &c.

ing, as far as in me lies, the favors you
confer on,

GENTLEMEN,

Your obedient,

and very humble Servant,

MAGNUS FALCONAR.

Crown Street, Strand,
September 26, 1777.

A
SYLLABUS, &c.

Lecture the First.

Introduction to the Study of
Anatomy.

Section the First.

*On the Component Parts of an Animal
Body.*

GENERAL observations on the fluids contained in an animal body,—Blood is given to all animals,—when circulating in the vessels, or flowing from the animal, appears *homogeneous,—when exposed to the

Blood.

* Homogeneous, *ομογενής*, from *ομος* *similis*, and *γενος* *genus*, having the same nature or principles.

B air,

Blood. air, separates, spontaneously, into two parts, †serum and §crassamentum,—Crassamentum sinks in the serum, but sometimes swims from the surface becoming dry||.

Of the Blood.

Blood—divided into three parts, viz. serum, coagulable lymph, and red particles,—Colour, in man,—quadrupeds,—birds,—fish,—and the amphibia, red—In some insects, green,—In water insects, colourless and transparent,—Salt to the taste,—of a gummy nature,—readily mixing with water.

Specific gravity, by Boyle, $\frac{1041}{1000}$; by Dr. Jurin, $\frac{1054}{1000}$,—differs in different animals,—and in animals of the same class from various circumstances, as health, &c.

† Serum, the watery fluid which separates from the red part; so called from its similarity to whey.

§ Crassamentum, the red cake or cruor swimming in the serum, which consists of the Coagulable Lymph and Red Particles.

|| A needle may be made to swim on water.

Red

Red Particles, commonly called Globules, and by Father de la Turrè, supposed *annular,—are more numerous, in proportion to the perfection and health of the animal,—in the lower classes of animals are few,—give the colour to the blood,—size, different in different animals,—in the human body 3240th part of an inch,—shape, in the human body, flat and round, like a piece of money,—in some animals, oblong or elliptical,—each particle is a compound, solid body, flat and round, consisting of two parts, viz. a small solid particle, called the central particle, and an external covering or vesicle, in which the former is contained like a pea in a bladder,—may be seen in the microscope,—the process explained,—the particles may be made spherical by an addition of water,—by a mixture with a solution of neutral salt, may be, again, restored to their original flat figure,—are not more oily, saponaceous or inflammable than the other parts of the blood.

Blood.
Red Particles.

* Annular, like a ring.

—an enquiry into the opinions of Senac and other authors, on the properties of the red part of the blood, —soluble in water and other fluids †, —the proportion of the red particles, in an healthy man, about $\frac{1}{3}$ of the whole mass.

Coagu-
lable
Lymph.

Coagulable Lymph, whilst in the course of the circulation, is supposed to be, of all parts of the blood, the most subtile; but, when out of the course of the circulation, or when received into a vessel and exposed to the air, becomes a solid, —it gives the firmness to the crassamentum, —forms the large masses in aneurisms, —plugs up the extremities of divided vessels, —polypi, —moles, or false conceptions, —membranes, —hairs, —worms of the blood, &c. —these explained, —it may be separated from the other parts of the blood, by various means, —An inquiry into the causes of coagulation, with observations on some morbid appearances of the coagulable

† See Experimental Inquiries, Vol. III. Ch. 1.

‡ Fibres of Malpighi. Gluten of Davies, &c.

lymph,—when once coagulated, is insoluble except in strong acids, alkalis, &c. by which its properties are destroyed.

Serum, a watery mucilaginous fluid, Serum.
—separates from the crassamentum, spontaneously,—divided into serum and serosity,—colour, in health, a bluish yellow,—is homogeneous,—coagulates in 160° of heat of Farenheit's thermometer, like the white of an egg,—neutral salts in the serum,—their use.

* Heterogeneous substances occasionally contained in it, as oil in globules, &c.—inspissated serum soluble in water.

Observations on the chymical analysis of the blood,—on the proportions of the different parts,—on the iron found in the blood, &c.—on the difference of colour, between arterial and venous blood.

Further observations on the coagulability of the blood, with an inquiry

* Heterogeneous, from *ετερον* *alterum*, another, *γενος* *genus*, kind,

6 *Of the Cellular Membranes.*

into the causes of coagulation,——

The morbid appearances of the blood explained, with an account of the changes produced on the blood by inflammation,—*polypi, how formed,——extravasated blood, how absorbed.

Observations on blood-letting. and on the treatment of hæmorrhages †.

Of the Cellular Membrane.

All parts of an animal body are formed of membranes, fibres, or inorganic matter,—each of these, originally, made from the fluids by secretion or some other process,——fibres differ in their degrees of organization.

Cellular
Mem-
brane.

§ Cellular Membrane, the most simple or least organized fibre,—found, universally, in all parts of an animal

* Polypus, from *πολύπους*, from *πολύς*, *multus*, and *πούς*, *pes*, a foot, an animal having many feet; is here applied to a concretion of blood in the heart, or in the large arteries near the heart.

† Hæmorrhage, from *αἷμα*, *sanguis*, blood, and *ῥέω*, *fluo*, to flow—a violent effusion of blood from any part of the body.

§ The *Tela Cellulosa* of Haller.

body

body,—is the common connecting medium,—is exceedingly ductile, allowing of easy motion,—the necessity of such a connecting medium demonstrated,—has interstices moistened by a fluid called *interstitial fluid.

Cellular Membrane, improperly so called, in most parts of the body bears no resemblance to a membrane,—is not cellular,—division into †reticular substance and ‡adipose membrane,—adipose membrane not universal,—wanting in the scrotum, eye lids, and penis.

Texture Reticular,—how demonstrated,—readily admits fluids to pass from one part of the body to another, as air, water, &c.—Observations on the § emphysema—on air extricated

* Interstitial Fluid, a fluid secreted on all the internal surfaces of an animal body, for the purpose of lubrication.—*vide* Interstitial Fluid.

† Reticular Substance, from *rete*, a net, the intexture of these fibres resembling net-work.

‡ Adipose, from *adeps*, fat, the apparatus in which the fat is contained.

§ Emphysema, from *εμφυσμα*, a disease in which the air is let loose into the interstices of the reticular substance, inflating the part.

by

by putrefaction,—the smallest fibre of the reticular substance, how formed,——Blood Vessels seen in the large masses——An inquiry into the opinions whether the minimi of the animal body are inorganic,——Observations on the formation of Adhesions.

Adipose
Mem-
brane.

Adipose Membrane, how differing from the reticular substance,——improperly called membrane,——a large gland extended throughout most parts of the animal body,—why not in all parts,—formed of small *cells,—these cells do not communicate,—each cell surrounded by a net-work of arteries and veins,——An inquiry into the manner in which fat is formed,——proofs that it is a secretion,——An inquiry into the use of the fat,—why distributed, so generally, throughout the human body,—finite use, as a reservoir of nourishment,——fat, of all other animal substances, the most nutritive,—proved by experiments,—least liable to putrefaction,—fat in the fœtus differs from that in the adult,—in

* Cell, a small bag or bladder.

young animals, found principally on the exteriors of the body,—an inquiry into some of the diseases of the cellular membrane,—*anasarca,—diffused †aneurism, — ‡ecchymosis,—§abscess,—how formed,—why circumscribed,—observations on inflammation,—on the formation of pus,—proofs that pus is a secretion,—observations on the quick absorption of fat producing white serum,—its symptoms and method of cure explained,—on the absorption of fat from disease,—fatty tumours, how formed,—how remedied.

* Anasarca, *ανασαρκα*, from *ανα*, *per*, through, and *σαρξ*, *caro*, flesh; a species of dropsy, where the water is contained in the interstices of the reticular substance—This disease is also frequently called leucophlegmatia, from *λευκον*, *album*, white, *φλεγμα*, *pituita*, phlegm.

† Diffused Aneurism, from *ανευγυνω*, *dilato*, to dilate, (in surgery) signifies a wound of the artery, and the blood diffused into the reticular substance of the limb.

‡ Ecchymosis, from *εχχω*, *effundo*, to pour out, and *αιμα*, *sanguis*, blood; blood extravasated from ruptured vessels under the skin, discolouring or giving a blackness to the part, generally attended with contusion, as the black eye, &c.

§ Abscess, a tumour containing pus.

Of Ligaments.

Liga-
ments.

Ligaments, very universal in the animal body for the purpose of tying parts together,—of two kinds, elastic and inelastic.

Elastic
Liga-
ments.

Elastic Ligaments, of a yellow colour,—have few blood vessels,—are but little organized,—specimens in different parts of the body, as between the vertebræ, &c. &c.—use in man,—in quadrupeds,—its action has no dependance on the will,—therefore not fatiguing, or expensive to the constitution.

* Elasticity not confined to animated matter.

Inelastic
Liga-
ments.

Inelastic Ligaments,—colour white, like burnished silver,—how distinguished from the elastic,—its organization explained,—given to connect parts where stability is required, as bones, &c.—to prevent luxation,—

* Elasticity is a power which some bodies possess, of constantly and equally, endeavouring to contract themselves to that form, from which they have been distorted; in animal matter, its action is the same in the dead as in the living body.

luxations

luxations attended with lacerations of the ligamentous fibre, unless from disease,—the inelastic more vascular than the elastic ligament,—has nerves, —is but little sensible in a sound state.

Of the Ligamentous Fibre.

Inflammations of ligamentous parts attended with great pain.

Tendons formed of the inelastic ligamentous fibre, are vascular,—have nerves,—external surfaces smooth and polished,—use, to connect muscle to bone. Tendons.

† Fasciæ, tendinous expansions,—formed of the ligamentous fibre,—found in different parts of the body,—are vascular,—have nerves,—their uses explained,—interosseous ligaments, what. Fascia.

Nervous Fibre.

Nervous Fibres take their origin from the brain and spinal marrow,— Nervous Fibres.

† Fascia, from *φαρμα*, a band, by the ancients called aponeurosis, from *απο*, *de*, from, and *νευρον*, a nerve, from an erroneous supposition that it was formed by an expansion of a nerve.

brain, a general description of,—division into cerebrum, cerebellum, medulla oblongata, &c.—nerves,—their number in the human body,—how rising from the brain, &c.—Brain,—substance vascular, soft, tender, of a pulpy texture,—has three coverings, dura mater, tunica *arachnoides, and pia mater,—nerves,—covered by the same coats,—are strong, white, inelastic chords,—substance of the nerves soft, as in the medulla,—each nerve, a †fasciculus of smaller threads,—smallest fibril computed 32400th part of a common hair,—supposed distinct threads from their origins to their terminations,—on the distinctness of sensations,—plexus of nerves explained.

Ganglion

‡ Ganglion, a swelling on a nerve,—substance, softer than the nerve,—

* Arachnoides, from *αράχνη*, a spider, and *ειδος*, form; so called from its supposed resemblance to a spider's web.

† Fasciculus, a little bundle.

‡ Ganglion, ΓΑΓΓΛΙΟΝ, in anatomy, signifies a swelling upon a nerve; in surgery, a collection of synovia in the course of the tendons.

more vascular.—Nerves distributed to all parts,—are the instruments of sensation and motion,—how far demonstrable,—modified to convey different impressions:—general observations on the *phænomena of the nerves,—also, on the different theories relating to them,—brain, the sensorium commune.—Nerves, the agents by which the mind acts on the machine, and is again acted upon.

Muscular Fibre.

Muscular Fibre makes all that part of the animal body called flesh,—colour, red in man and quadrupeds, —in some birds and fish, white,—red colour, not inherent in muscle,—muscle may be made white,—parts may be muscular, tho' not red, as the iris, &c.

Muscular
Fibre.

Fasciculi of fibres explained,—the ultimate fibre too small to be demonstrated,—muscles, in the dead body, soft and inelastic,—in the living, ca-

* Phænomena, plur. of phænomenon, from φαίνω, *appareo*, to appear.

pable of exerting great force,——have arteries, veins, nerves and lymphatic vessels.——An inquiry into the supposed structure of the smallest fibril.——On the phenomena of muscular action,——power different from elasticity,——action not constant,——dependant on the nervous influence,——may be exerted by stimuli,——stimuli, of different kinds,——mental stimulus, what,——mechanical, what, &c.——This power of contraction called irritability,——An inquiry into the doctrines of sensibility and irritability;——muscles become stronger, in proportion to the frequency and energy of their action.

Of the Arteries.

Arteries.

* Arteries, hollow, elastic tubes, beginning from the heart, to carry blood to the different parts of the body,——their number, two; aorta and

* Artery, from ἀήρ, aer, air, and τηρεῖν, seruo, to keep; was first applied to arteries, by Erasistratus, at the school of Alexandria, from an hypothesis that they carried the finer parts of the blood mixed with air, which formed the animal spirits,

arteria

arteria pulmonalis.—A general description of the circulation of the blood.—The course of arteries always in the centre of the body, or limb, taking the shortest tracts to the parts they are to supply,—are defended from compression, &c.—branches, near the heart, go off at obtuse angles,—the further from the heart, the angles the more acute,—use of obtuse angles, to lessen the momentum of the blood,—plexus of arteries explained,—arteries, on some parts, run convoluted, as on the uterus, testis, &c.—divided into three classes, sanguiferous, feriferous, and lymphatic,—this division how far necessary, to account for many phenomena,—how demonstrable.—Capillary arteries, what,—exhalant arteries, what,—*anastamoses, their use,—where found,—not met with in glands,—coats of arteries, three

* Anastamosis, from *ana*, *per*, through, and *σταμα*, *os*, a mouth; is by the moderns used to signify the opening of one vessel into another; but by the Greeks was used in a different sense, *viz.* a termination of arteries on surfaces, from whence the term, bleeding by anastamosis.

in number,—may be separated,—the external coat has fibres, in all directions,—the second has circular fibres,—the internal, a smooth, dense membrane to prevent *transudation,—are connected by the reticular substance,—are elastic,—besides these, arteries have muscular fibres,—how demonstrated,—are irritable,—|| valves of arteries, where placed,—their use, —Vasa vasorum, what?—their use. —artery, in a transverse section, always a circle,—An inquiry into the opinions whether arteries are †conical or ‡cylindrical,—are conical,—the apex of the cone in the heart,—the sum of the lights of all the branches,

* Transudation, from *trans*, through, and *sudo*, to sweat; an oozing of the fluids contained in vessels through their coats; also, sometimes, called diapedesis, from *δια*, *per*, through, and *πρὸς ὧν*, *salio*, to leap.

|| Valves, little membranes that stop the return of the blood, from *valvæ*, folding doors.

† A cone, whence conical, means a circular figure, or, in anatomy, a vessel gradually becoming smaller, the larger extremity of which is called its base, or basis, the narrower, its apex.

‡ Cylinder, whence cylindrical, a figure, or vessel, whose diameter is the same in all its parts, contrary to the cone.

con-

considerably, larger than the trunk.—
Does a vessel independent of its giving
off branches, become larger?—on
the motion of the blood in the arteries,
—on the pulsation of arteries,—
the *systole and †diastole of arteries
explained,—on the impetus of the
blood.—an inquiry into the doctrine
of pulses,—pulses divided into the fol-
lowing kinds.

Fortis, Debilis.

Plenus, Parvus.

Celer, Tardus.

Frequens, Rarus.

Mollis, Durus.

Regularis, Irregularis.

Intermittens.

Observations on the manner of feel-
ing the pulse, with an explanation of
the above terms.—Arteries termi-
nate in veins, on surfaces, and in the
cells of glands.

* Systole, the contraction of the heart and arte-
ries, from συστέλλω, *contraho*, to contract.

† Diastole, the dilatation of the heart and arteries,
from διατέλλω, *diduco*, to set open.

Of the Veins.

Veins.

Veins are elastic tubes, terminating in the heart,—the reverse of arteries,—found in all parts of the body,—thinner and denser than the arteries—when cut, collapse, are seven in number, *viz.* two cavæ, four pulmonary, and the vena portarum,—have vasa vasorum similar to arteries,—begin from arteries, only, by continuity of canal,—are divided into three classes, sanguiferous, seriferous, and lymphatic; corresponding with the three classes of arteries,—fluids pass readily from the arteries into the veins,—continuity of canal demonstrated,—coats of veins, three in number, similar to those of arteries,—may be separated in the large veins,—are denser and less elastic than in arteries,—have muscular fibres,—are irritable,—how demonstrable.—Valves, how formed,—commonly two in number,—very numerous in the extremities,—always make a swelling on the vein,—wanting in the veins of the viscera, heart, brain, &c.—an inquiry into their use;—the smallest veins, probably, without valves.—

Veins

Veins more numerous than arteries,—are larger,—consist of two sets,—one, deep-seated, accompanying the arteries,—the other, superficial, lying under the skin, called cutaneous.——
 Vena portarum described,——veins of the viscera always attend the arteries,——motion of the blood in the veins, in an equal stream, not like that of arteries,—a comparative view of veins and arteries,——veins, conical,—apex terminates in the heart,—may pulsate near the heart,—cause explained.——
 An inquiry into the quantity of blood supposed to be contained in the human body,—this, different in different persons,—probably greater in lean than in fat people,——on a medium, supposed to be from twenty to thirty pounds,——how often does the mass of blood pass through the heart?——if thirty pounds, in less than two minutes,—the calculation explained.——
 —Reflections on *phlebotomy,——on †arteriotomy:——observations on

* Phlebotomy, blood-letting, from φλεψ, *vena*, a vein, and τεμνω, *feco*, to cut.

† Arteriotomy, the opening of an artery, from αρτηρια, an artery, and τεμνω, to cut.

the doctrines of derivation and revulsion, with some practical remarks.——
 On the *varix,—the manner of treating varices.——On the diseases of the venous system.——Ossification of arteries,—its consequences considered, further observations on hemorrhages, —and on the means used to restrain them under different circumstances ; ——hemorrhages, frequently salutary.

Of the Lymphatic System.

Lympha-
tic system

General reflections on the manner, in which the animal body is nourished. ——Lymphatic System, generally, divided into three parts, viz. lymphatic vessels,——lacteals and thoracic duct.

Thoracic
duct.

Thoracic duct the trunk of the system,—its situation,—extent,—size. —*Receptaculum Chyli*,—how form'd,—thoracic duct has blood vessels, nerves and muscular fibres, has three coats similar to veins, terminates in the

* Varix, a diseased enlargement of a vein from inflammation.

angle between the jugular and subclavian veins, on the left side.

Lymphatic vessels exist in every part of the body,——definition of the term,——differ from lymphatic veins,——have a great number of valves ; five or six pairs in every inch,——their coats dense and transparent,——are supposed three in number, like veins,——are too delicate to be separated,——have muscular fibres,——proofs of their existence ;——have *vasa vasorum*, originate from surfaces only,——absorb like capillary tubes,——proofs that they do absorb ;——terminate in the thoracic duct,——consist of two sets, external and internal.—internal accompanying the larger arteries,——external, or superficial, like the cutaneous veins, lying immediately under the skin,——the two sets communicate,——their communication demonstrated,——lymphatics, coming from the right side of the neck and right arm, open into the angle, between the jugular and subclavian veins, on the same side ;——lymphatics, on the right side of the thorax, pass under the aorta.

Lymphatic vessels

Lacte-

Lacteals

Lacteals arise from the internal surface of the intestinal canal,—absorb the nutritious part of the aliment,—terminate in the thoracic duct:—structure corresponds exactly with the lymphatic vessels;—orifices of the lacteals demonstrated.

Lymphatic glands

Lymphatic glands defined,—situation in the course of the lymphatic vessels;—have arteries,—veins,—nerves,—lymphatic vessels and cells,—the lymphatic vessels in their passage to the thoracic duct, enter and pass through them,—this process explained.

An inquiry into the properties of the fluid, secreted by the lymphatic glands.

An account of the discovery of this system,—lacteals first discovered by Asellius, in a kid, 1627—receptaculum chyli, and thoracic duct, by Pecquet, 1661,—the lymphatic vessels by Rudbec, in Sweden, 1662,—and, about this time, by Bartholine, in Denmark; and Dr. Joliffe, in England.—In the year 1768, Mr. Hewson compleated the discovery of this

system

system, by demonstrating the existence of the lymphatic vessels, in birds, fish, and *amphibious animals.

Lymphatics, the only system of absorbents,—proofs that they are so,—1st, their analogy with the lacteals,—2dly, the ingress of poisons into the body, as of the venereal, variolous, cancerous, &c. inflaming the glands through which they pass,—3dly, the absorption of matter from ulcers, &c.—4thly, the fluid contained in the lymphatic vessels, being similar to the fluids contained in those cavities, from which the lymphatic vessels arise,—5thly, the existence of the lymphatic system in all animals,—an inquiry into the prevailing opinions, previous to the discovery of the lymphatic system.—A refutation of the arguments brought in favour of absorption by red veins.

* Amphibious, from *αμφω ambo*, or *αμφι utrinque*, and *βίος, vita*, life; animals that can live in two elements.

Of Glands.

Glands.

† An inquiry into the utility of glands, and of secretions in general.

—Gland, a name given to all parts, particularly organised, for the purpose of separating from the blood fluids of different properties, to be applied to the various uses of animal œconomy, or to be thrown out of the body, as useless or hurtful,—known in the early ages of anatomy.—Sylvius' division into two kinds, ‡ conglobate and *conglomerate,—his ideas exploded;—divided into two classes, simple and compound,—simple gland explained,—may be formed by an artery only,—this the most universal in the animal body,—proved to exist in all parts.

† Gland, *αδν*, *glandula*, an acorn; a term, originally, given by the Greeks to the lymphatic glands only, from their supposed resemblance to acorns.

‡ Conglobate smooth on its external surface.

* Conglomerate, on the external surface, rough and irregular.

Com-

Compound glands defined,—are of different kinds,—secrete fluids of different properties,—glands of this class correspond with each other in their general structure,—have arteries,—veins,—nerves,—lymphatic vessels,—excretory ducts and cells.——Arteries divided into small branches, investing each particular cell of which the gland is composed,——in some glands, have one centre of ramification;——ramification of arteries, different in different glands,——smallest branches, called exhalents, open into cells;——veins return the blood from the arteries,——arteries going to glands, differently constructed,——are denser than those going to other parts,—collapse, when cut through,——are more muscular.——An inquiry into the opinions, concerning the changes produced on the coats of arteries entering glands,——on the coverings of glands,——how formed,—their use;——the excretory ducts arise from the cells,——cannot be injected from the arteries, or veins, unless by rupture.

Excretory Duct, how formed,——has muscular fibres,——lymphatic ves-

sels arise from its internal surface,—their use, to depurate the fluid,—cells may be filled by injecting the excretory duct,—excretory ducts of different glands, differently constructed,—lymphatics, excretory ducts to some glands,—the fact demonstrated.

On particular Glands.

**Glandula
Adiposa.**

Glandula Adiposa, commonly called adipose membrane,—an apparatus extended throughout most parts of the body, for the secretion of fat,—consists of cells, which do not communicate with each other,—each cell surrounded by a net-work of blood vessels, nerves and lymphatics,—lymphatic vessels arising from the cells become excretory ducts to this gland,—these facts demonstrated.—Proofs that fat is a secretion, and not a mere filtration,—reflections on the manner in which fat is secreted,—an inquiry into the use of fat, in the human subject, and other animals,—on the diseases of the adipose gland.

Kidney.

Kidney,—figure, different in different animals,—found in all animals,

—its

—its general structure the same in all;
 —consists of two parts, called cortical and tubular,—these parts vary in their proportion in different glands. The kidney has an artery, a vein, nerves, lymphatic vessels and excretory ducts,—the uses of each explained.—Observations on the difference of ramification of arteries in different glands,—corpora globosa, or cryptæ of Malpighii, not cryptæ, but convoluted arteries.—Cells of the kidney,—their figure.—On the manner in which the arteries ramify upon the cells.—On the beginning of the excretory ducts.—Reflections on the secretion of urine.

Liver,—its peculiarities explained, Liver.
 —cells demonstrated,—origin of the excretory ducts shewn,—observations on secretions in general;—secretion, a decomposition of the elementary parts of the blood, and a new combination formed *sui generis*,—on the appendages to glands, as the gall bladder, urinary bladder, mucus-follicles, &c.—An inquiry into the different theories of secretion,—on perverted secretions,—on increased

secretions, with an inquiry into their causes. *Note*, The kidney and liver are here, only, adduced as specimens of compound glands, which will, hereafter, be more fully explained, when we treat of each particular subject.

Further reflections on glandular secretion. — Interstitial fluid, — found on all the internal surfaces, and in all cavities of an animal body, for the purpose of lubrication, — an inquiry into its source. — A review of the doctrine of transudation, — proofs that no transudation takes place in the living body, the experiments, on which this theory is built, are false, and the theory weak. — Proofs that the interstitial fluid is a secretion: — the properties of this fluid differ in different states of health, — in the healthy animal, it will coagulate on exposure to the air, — loses of its coagulability, as the animal becomes weak, and *vice versa*; — properties of this and all other secreted fluids may be changed by an increased or diminished state of action of the vessels. — Reflections on the plastic power of arteries, — proofs that they possess such a power. —

An inquiry into the doctrine of inflammation.—On the formation of pus;—pus, a secretion,—experiments to prove it.—Further observations on absorption,—proofs that lymphatic vessels act as capillary tubes,—the use of villi explained.—How do lymphatics absorb from smooth surfaces?—absorption cannot take place in the dead body.

On the progress of the lymph in the lymphatic vessels,—on the use of their valves,—on their muscular fibres,—on the effects of collateral pressure, &c.

Reflections on scrophula.

Of the Structure of Bone:

Bones, of all parts of the body, on first sight, have least the appearance of organization,—are not mere concretes,—are evidently organized,—have blood vessels entering at all parts,—how demonstrable. ~~Texture~~ Texture, fibrous,—fibres, longitudinal, or radiated, according to the figure of the bone;—bones have tranverse fibres, forming lamina or plates,—how separated.

Bone.

*consist of the
animate
inanimate*

—Fibres most conspicuous in growing bones,—evanescent in old age,—old bones appear compact,—fibrous texture may be seen in them, if burnt.^x

—All bones, more or less hollow,[†]—in cylindrical bones, cavities are large,—are intersected with bony fibres, called cancelli*,—are filled with fat:—cancelli, most compact in the centre, and more delicate towards the extremities; coarser towards the surface, in the axis, reticular.—Bones are porous,—the pores, how seen,—use, to admit vessels to enter all parts of the bone.—Cavity of the bone larger at its extreme parts.—Why are bones hollow? not for the lodgement of marrow, but to give greater strength with the same number of fibres;—hence in birds, bone thin, cavity large;—annual plants, as corn, &c. are proofs of this assertion.—Medullary canals explained,—their use, to admit blood vessels.—In flat bones, as those of the skull, the cancellated structure, between the two plates, called diploe.

* Cancelli, lattice-work.

—All bones have arteries, veins, nerves and lymphatic vessels.—Do arteries entering into bones, deposit their coats?—Arteries, their use.

—Bone, not sensible in a sound state, but highly so in disease.—

Why are bones without feeling?—physical reason, they have but few nerves—final, feeling would have been inconvenient.—Lymphatics absorb,—proofs that they do so.

Marrow, found in the cavities of Marrow.
all bones,—consists of a congeries of cells,—forms a part of the glandula adiposa.—Marrow appears differently in different parts of the same bone :
—hence, the division into the medulla and succus medullaris,—this division how far just.—The extremities of cylindrical bones seem more vascular than their centre, — this appearance explained ; — flat bones, uniformly vascular.—Cells in which the marrow is lodged, surrounded by plexuses of small blood vessels.—Is marrow sensible?—not acutely so, in the sound state,—very sensible, in disease. — Marrow, its use,—supposed to prevent brittleness,—not true ;
—how

—how proved.—Brittleness of bone,
 —from whence arising.—Marrow
 said to transude into joints,—not just.
 —Final use,—it is part of the glandula
 adiposa, and as nature provides for a
 constant and nearly equal supply of
 nutriment, fat is made, and deposited
 in the cavities of bones, and other
 parts, which would otherwise have
 been unoccupied,—hence, bones were
 not made hollow to contain fat, but
 being made hollow to answer other
 purposes, marrow is deposited in them,
 —in dropical habits, where the fat is
 absorbed from the exteriors and other
 parts of the body, the marrow is ab-
 sorbed also.—Marrow, its diseases,
 —being vascular, is subject to inflam-
 mation, suppuration, &c.—hence,
 spina ventosa.—Concussion said to
 happen,—how far true.

Periof-
 teum.

*Periosteum, a membrane invest-
 ing the external surfaces of all the
 bones of the body, except where they
 form joints,—structure, of a white,
 compact, ligamentous, or tendinous

*Periosteum, from *peri*, *circum*, about, and
ostion, *os*, a bone.

nature,—more vascular than ligaments,—has vessels for the use of the bone, arteries, veins, nerves, and lymphatic vessels,—consists of different layers,—external, are adventitious, being expansions of the tendons and ligaments inserted into the substance of the bone,—hence thicker near the insertions of large tendons and ligaments.—Periosteum, said to make a general covering to the skeleton,—this idea not perfectly just.—Are the internal cavities of bones covered by periosteum?—it may be demonstrated in some bones, and, probably, exists in all.—This called internal periosteum.—Periosteum, its use,—gives a smoothness to the bone, lessening friction with the soft parts,—allows of blood vessels to be divided into small branches, which enter all parts of the bone,—strengthens the connection between the epiphysis and body of the bone,—gives a more commodious attachment to muscles, &c.—An inquiry into the other uses that the periosteum has been said to have.—In the silken fowl, from the Coast of Guinea, periosteum

black.——Diseases,—inflammation and its consequences,—periosteum suppurates unkindly,—sloughs,—affects the bone in consequence,—matter formed between it and the surface of the bone,—venereal poison readily affects it,—forms nodes.——Colour of bone: in prepared bones, colour different, from a great variety of causes,—in fresh bones, different, from age,—young bones redder, having more vessels in proportion to the cretaceous matter,—different in different parts of the same bone,—colour altered by animals feeding on madder.

Chemical
Analysis.

Chemical analysis,—bones yield the same elements as all other animal substances,—earth in different proportion, in different bones,—proportion, about $\frac{5}{9}$ ——If the caput mortuum is burnt in a close vessel, it gives ivory black,—if in an open one, leaves a pure virgin earth, free of salt,—hence used in making cupils.——Earth, not only of bone, but of all other parts of the body, when the other principles are destroyed, still retains a slight degree of adhesion: hence skeletons,

found

found in vaults, appear perfect, but moulder away on being touched, or exposed to the air.

Cartilages,—white, elastic substances,—of three different classes,—those of the 1st supply the place of bone in the adult, as in the ear, nose, larynx, trachea, &c.—their advantages:—Those of the 2d. supply the place of bone, in the early part of life, 'till bone can be formed.—Those of the 3d. form the articular cartilages, or those crusts which cover the ends of bones, where they form joints, to make motion easy, and prevent abrasion.—Cartilages covered by a kind of periosteum, called *perichondrium.

Cartilage.

Structure of the different classes, different.—Those of the 1st class, covered by a ligamentous membrane, similar to the periosteum,—have blood vessels; these small and not numerous;—have also nerves,—are little sensible,—not subject to disease,—bear

* Perichondrium, from *peri*, *circum*, about, and *χονδρος*, *cartilago*, a cartilage.

pressure better than other parts.—
 Those of the 2d class, covered by that periosteum which, afterwards, invests the bone,—are very vascular, admitting arteries, veins and lymphatic vessels, that, afterwards, exist in the bone,—serve as a nidus for the bony fibres to shoot in.—Those of the 3d class, very elastic,—compact,—have no vessels that can be demonstrated; yet, probably, are not inorganic,—have fibres that may be separated by maceration,—not sensible,—have no perichondrium,—use, to give smooth surfaces,—to prevent abrasion and break off the force of collision,—are not subject to disease,—but, may be destroyed by diseases in the neighbourhood, — do not pullulate, — become black and slough by exposure to the air,—do not exfoliate like bone,—how separated from sound parts.

Liga-
ments.

Ligaments are to bones, what tendons are to muscles;—structure explained;—are but little sensible.

Capfular
Ligam.

Capfular Ligament, — a connecting medium between two bones, making a

fort

sort of purse, or bag, containing the *synovia of the joint.

Structure of the ligamentous kind, —consists of two layers, different in their nature and origin,—these distinguished by the epithets, external and internal,—the external one consists of the ligaments, which tie the bone together, and seems to be continued into the periosteum;—the internal, is a smooth, delicate, thin, dense, reflected membrane, extremely vascular,—can be traced to the edges of the articular cartilages, but, probably, is not continued over them.—Use,—the external, gives strength, and prevents luxation,—the internal, secretes the synovia for the lubrication of the joints.——An inquiry into the injuries the capsular ligament sustains from luxations.

Luxations arise from a variety of causes, as external violence, relaxation of the ligaments, &c.—proved from dissections.

Synovia, a term given by Parcellus to the fluid contained in the joints.

Synovial

Synovial
Glands.

Synovial Gland,——a term improperly applied to a fatty substance found in most joints of the body;—its office supposed to secrete synovia.——An inquiry into the opinion of Havers on this subject:—is not a synovial gland:——An inquiry into the manner in which synovia is really secreted.——Observations on the properties of synovia, and the morbid changes produced on it.

Classes of
Bones.

Bones, from their configuration, are divided into four classes, the 1st, consisting of flat bones, as those of the skull, compact on both sides, and spongy within.——The 2d, of spherical, or of such as approach towards that figure, as the bones of the carpus, tarsus, &c. having a thin bony plate externally, being spongy or cancellated, internally.——The 3d, consists of irregular bones, as the vertebræ.——The 4th, of oblong or cylindrical bones, as those of the extremities: these have large cavities,—their ends being enlarged, make the joints stronger, remove the muscles further from the centre of motion,

and,

and, thereby, give their tendons a more advantageous attachment, whilst the middle being small, gives a convenient lodgement to the bellies of muscles.

Bones have eminences of different kinds, distinguished by the following names; *head, — †condyle, — ‡tuberosity, — §corona, — ||spine, — ¶supercilium, — **labrum, &c.—these terms explained.——Bones have processes to give necessary shape for articulation, and for muscular attachment, some of them being levers; also, for giving advantageous insertions to muscles,—are variously formed, and distinguished by proper names. ————— Processes

* Head, a round process with a neck, always denoting the upper extremity of the bone.

† Condyle, *κονδυλῶς*, properly applied to the joints of the finger; signifies also, an oblong process from the fore to the back part of the bone, used in that kind of articulation called ginglymus.

‡ Tuberosity, a rough, knotty eminence.

§ Corona, a sharp, thin process, also called crist, or spine.

|| Spine, from *spina*, a thorn, a long, sharp process.

¶ Supercilium, a brow.

** Labrum, a lip.

are

are *apophysis and †epiphysis ;—these terms explained.

Cavities.

Cavities are of two kinds, viz. for articulation, and for giving lodgement to soft parts, as †cotyle, — Sæc-
tabulum, — || glene, — ¶ alveoli, —
**fossa, — groove, — sinus, — sinuosity,
— hole, — canal, — furrow ;—these ex-
plained.

The combination of bones consists of articulation and connection. —

Articulation means the forms of the parts to come in contact, and the relation they bear to one another. —

Connection means the binding by some other substance.

* Apophysis, from ἀποφύω, *produco*, a process growing out from the surface of the bone.

† Epiphysis, from ἐπιφύω, *acresco*, to grow to, a distinct ossification in the young animal, which, afterwards, growing to the body of the bone to which it belongs, makes it perfect.

‡ Cotyle, from κύων, a cup, a round; deep cavity.

§ Acetabulum, the same.

|| Glene, from γλήνη, properly signifies the socket of the eye; but is also used to express a shallow cavity in bone, as cotyle does a deep one.

¶ Alveoli, the sockets in which the teeth are placed.

** Fossa, properly a ditch, a deep cavity between two bones.

Galen's division into, 1st, Arthron	{	*Diarthrosis.	{ †Enarthrosis. ‡Arthrodia. §Ginglymus.
		Synarthrosis.	{ ¶Sutura. **Harmonia. ††Gomphosis.
		2nd, ††Symphyfis.	{ §§Synneurosis. Synchondrosis ¶¶Syssarcosis.

* Diarthrosis, from *δια*, *cum*, with, and *αρθρον*, *membrum*, signifies that kind of articulation which gives to the joints considerable motion.

† Enarthrosis, from *εν* and *αρθρον*, is applied to joints having motion in all directions, as the joints of the humerus, &c.

‡ Arthrodia, the same as enarthrosis.

§ Ginglymus, from *γίγλυμος*, *cardo portæ*, the hinge of a door; admitting of flexion and extension, only, in one direction.

|| Synarthrosis, from *συν* and *αρθρον*, a species of articulation that has no manifest motion.

¶ Sutura, a seam, the articulation of the bones of the head.

** Harmonia, *concentus*, harmony; where the surfaces of the two bones so exactly correspond with each other, that they leave no intermediate space.

†† Gomphosis, from *γομφος*, *clavus*, a nail; where the bone is driven in, like a nail, as the teeth in the jaw-bone.

‡‡ Symphyfis, or synthesis, from *συντιθημι*, *compono*, the binding of joints.

§§ Synneurosis, from *συν*, *cum*, and *νευρον*, *nervus*, connection of bones by ligaments, which were by the Greeks called nerves.

||| Synchondrosis, from *συν* and *χονδρος*, *cartilago*, a cartilage; the union of bones by cartilage, as of the epiphyses to the bodies of the bones.

¶¶ Syssarcosis, from *συν*, and *σαρξ*, *caro*, flesh, the union of bone by muscle only, as the scapula of the quadruped; but, in the human body, we have no instance of this species of articulation.

Note, Great firmness in joints, and great extent of motion, are incompatible, and therefore, one of them is generally found to be procured at the expence of the other; for example, arthrodia, is weak; ginglymus, strong.

Observations on the diseases of joints, particularly on *luxations and †subluxations.—An inquiry into the different causes producing ‡anchylosis.

On the Formation of Bone.

All bones formed in cartilage;—consist of fibres, which branch differently in different bones.—§ Ossification first takes place in the centre.—In flat bones, fibres are radiated,—in cylindric, shoot towards the extremities,—in spherical, quaque vèr-

* Luxation, from *luxo*, to disjoint.

† Subluxation, a partial dislocation.

‡ Anchylosis, from *ανχυλῶ*, *curvus*, crooked, the stiffness of the joints, a disease, where the bones growing into each other, the motion of the joint is lost.

§ Ossification, from *os*, bone, and *facio*, to make, the formation of bone.

sum

sum,—form lamellæ. — First appearance of ossification explained. — An inquiry into the growth of bones. — An examination of the two principal theories, invented by Du Hamel and Havers, to explain the growth of bones.

Bone,—a new formed substance,—consists of earth and gluten,—at first, solid without cancelli,—the appearance of cancelli when first distinguishable,—earth of bone, not permanent,—constantly changing, during the growth of the animal. — Observations on the feeding of animals with madder, in the different periods of their existence. — On the changes produced on bone, by acids, alkalies, &c. — The generality of bones not completely formed, 'till the age of puberty:—hence the use of epiphyfes. — Some bones perfectly formed, at or before the time of birth, as the *oscula auditus*.

Observations on the re-union of bones. — An account of the success of several experiments made on the broken bones of animals, with re

Callus,

marks on the manner in which *callus is formed, to which will be added some practical observations on the treatment of fractures in general.

* Callus, a new formed substance, secreted for the purpose of uniting broken bones.

End of the First Section.

Section

